SMARTDAC+™

Data Acquisition & Control

Bulletin 04L52B01-01EN

www.smartdacplus.com

vigilantplant.®
The clear path to operational excellence

YOKOGAWA

Data Acquisition & Control

SMARTDAC+™

Your business environment is complex and fast changing. You need smart and powerful systems that can adapt to your process.

SMARTDAC+™ is a fresh approach to data acquisition and control, with smart and simple touch operation as a design priority. Measure, display and archive process data with greater levels of clarity, intelligence and accessibility.

The SMARTDAC+™ concept begins with the all-new GP, an integrated I/O and recording system with a familiar touch operator interface. Highly adaptable, very capable and easy to operate is the new GP.

Now that's SMART.

Smart User Interface

Provides a smooth, familiar user experience

Observe

- Variety of display functions
- Powerful data search functions
- Status indicator lamp functions

Interact

- Touch screen for intuitive operation
- Easy-to-navigate, user-oriented design
- Supports freehand messages

Smart Architecture

Enables a scalable data acquisition system

Adapt

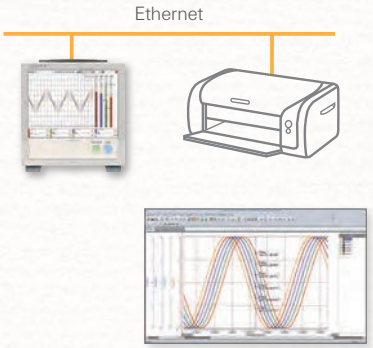
- Add I/O modules when you need more channels
- Low temperature operation
- Locking front panel for media security

Measure

- Wide-ranging input/output specifications
- Multichannel I/O
- Easy-to-read screens

Smart Functionality

Offers a seamless data transfer environment

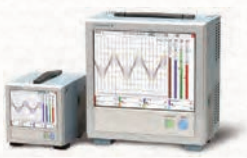


Record

- Direct output to printers
- Convenient report creation function
- Viewer software for data analysis

Connect

- Browser-based real time monitoring
- Centralized data management via FTP server
- Powerful networking functions



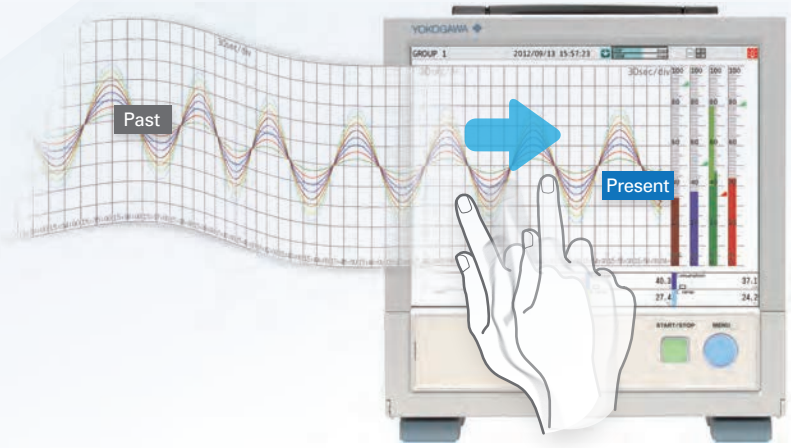
Paperless recorders (portable type)

Input/output modules

STANDARD software

Smart User Interface

An intuitive UI engineered for ease-of-use



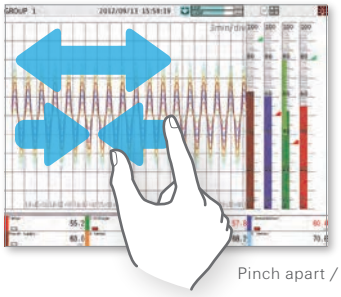
Flick

Seamless display of historical trends

Flick or drag even during measurement to scroll data for seamless display of historical trends.

The touch screen works even when you are wearing gloves.

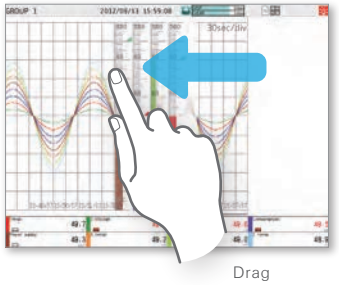
Zoom in or out on the time axis



Pinch apart / Pinch together

Pinch together : Zooms out on the time axis
Pinch apart : Zooms in on the time axis

Move the scale to view details



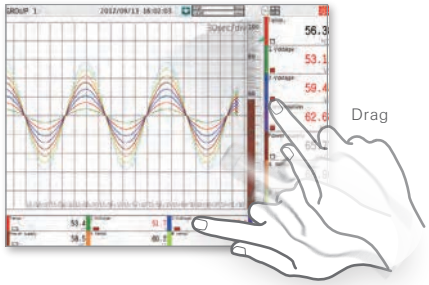
Drag

[Patent pending]

Drag the scale to display corresponding digital values.

You can insert your own BMP images to customize the scale.

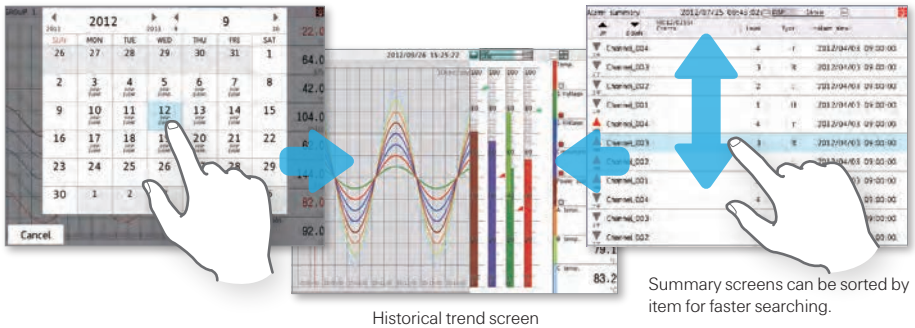
Change the position of digital values



You can drag the digital display section up, down, left, or right to change its position.

Powerful search functions

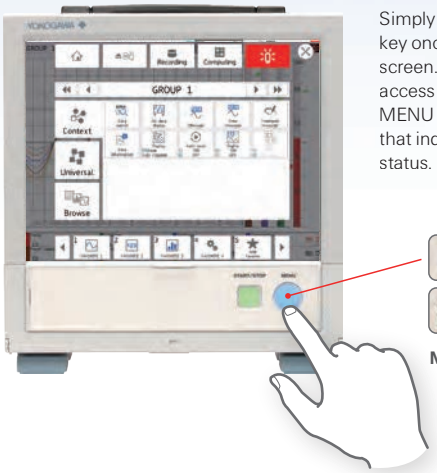
Easily find data using various displays including calendars and summary screens.



Historical trend screen

Summary screens can be sorted by item for faster searching.

Display the menu at the push of a button



Simply push the front panel MENU key once to display the menu screen. The menu screen gives you access to a variety of functions. The MENU key is backlit by a color LED that indicates operating and alarm status.

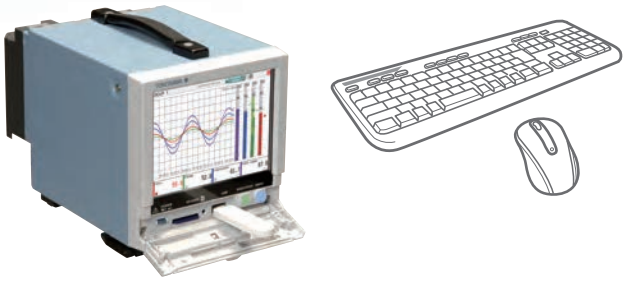
Blue:Running (no alarms)

Red:Alarm occurring

Not lit:Power off

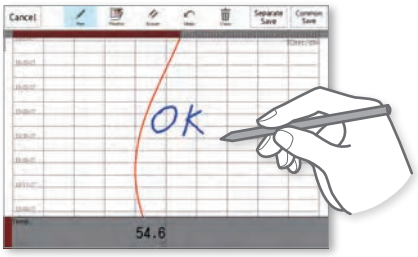
Connect a mouse and keyboard for a "PC feel"

With the USB interface option, you can connect a keyboard and/or mouse to control on-screen operations (text input, etc.). And with USB memory, you can save data and easily transfer it to a PC.



Write freehand messages

You can draw or hand-write on the waveform area using a stylus (included) or the tip of your finger. You can even select a color and line width.



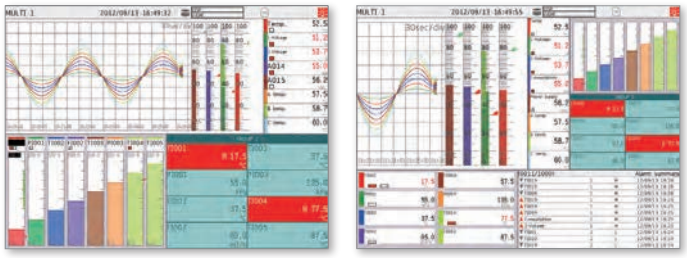
User interface designed for real people

Human factor led design concepts guided us in everything from screen colors and button sizes to navigation between screens—the result is an intuitive and easy user experience. The menu screen is translucent, so you can even keep your eye on your data while entering settings.

Monitor multiple screens at once on the multi-panel display

You can divide the display into 2 to 6 sections and assign each to your choice of screen. You can select from 9 forms (of 2 to 6 screens each), and save up to 20 multi-panel configurations.

Multi-panel display

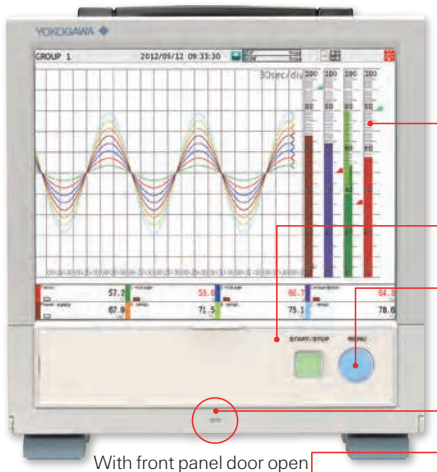


The multi-panel display is supported only by the GP20.

Smart Architecture

Highly flexible and scalable architecture

GP20



With front panel door open

LCD screen
Displays operating screens such as trend graphs, and setting screens.

Operation panel

MENU key
Simply press the MENU key to display a menu for access to a variety of screens.

Front panel door lock mechanism

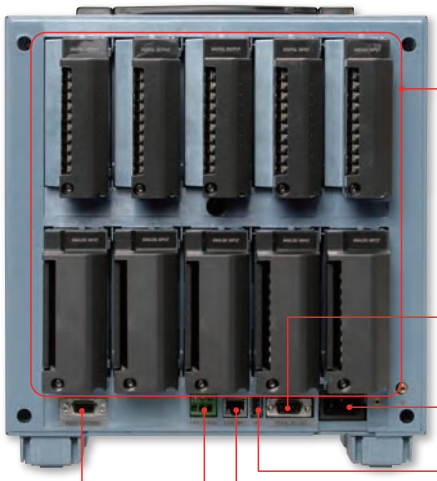
START/STOP key
Starts and stops recording.

Stylus
For writing freehand messages.

USB port [Option]
Supports USB 2.0.

SD memory card slot
SD memory card (up to 32 GB)
(format: FAT32 or FAT16), 1 GB included

Power switch
The main unit power switch.



Input/output module slots
For connecting input/output signal wires from the device under test. For connecting input/output signal wires for hardware options.

Serial communications port [Option]
Terminal for RS-422/485 or RS-232 communications.

Power inlet
(GP10/GP20)

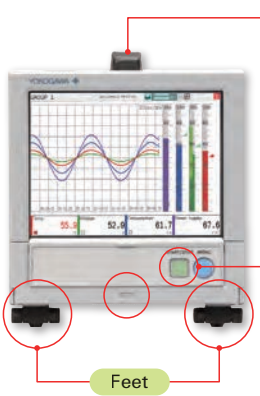
USB port [Option]
Supports USB 2.0.

Ethernet Port
A 10Base-T/100Base-TX port.

FAIL output terminal [Option]

VGA output connector [Option]
External monitor connector.

GP10



Handle

The START/STOP key can be used when the operation panel is closed.

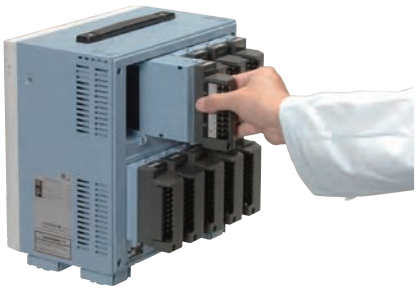
Feet

- ***Easy-to-read display***

GP20: 12.1" TFT color LCD, 800 × 600 dots
GP10: 5.7" TFT color LCD, 640 × 480 dots

Modular construction for expandable input/output

Select from a wide variety of input/output modules. The I/O terminals are detachable and come in M3 screw and clamp-terminal types.
The highly flexible design allows you to add or remove modules at any time in the future.



* The GX90YD is only available with M3 screw type terminals.

Your choice of input/output

GX90XA analog input module: DC voltage, thermocouple, RTD, contact input
GX90XD digital input module: Remote control, and more (open collector / non-voltage contact input)
GX90YD digital output module: Alarms, and more (relay, c contact input)

Multichannel measurement and recording

Supports up to 100 channels of input.

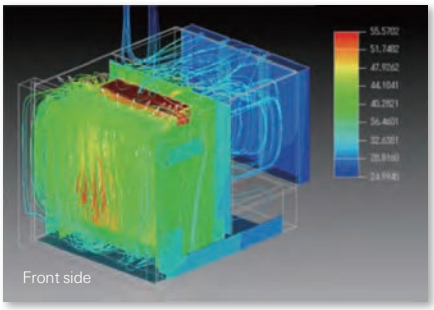
Up to 100 channels
GP20

Up to 30 channels
GP10

Heat dissipating construction

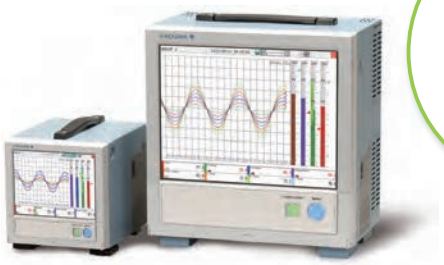
The GP was built for heat dissipation to ensure an even temperature distribution between module terminals.

Heat analysis result



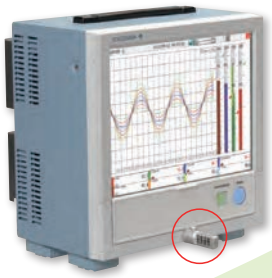
Portable models

Our portable models are easy to take anywhere, and offer the same functionality and ease-of-use.



Highly secure

The front panel door can be locked to prevent mishandling of the power switch or external media.



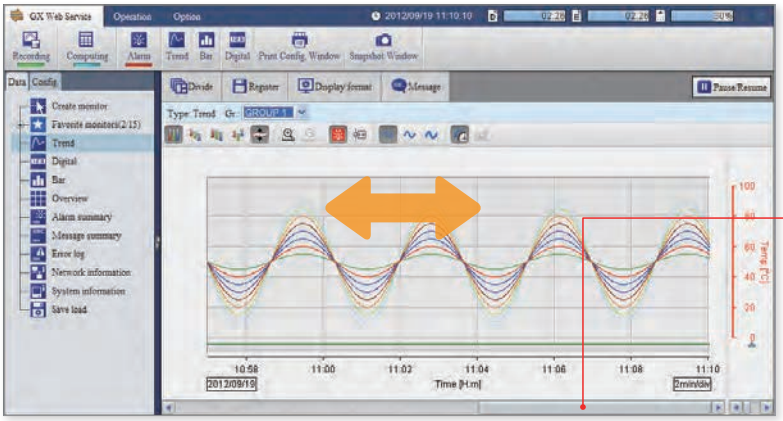
Smart Functionality

A full range of network functions and software

Web applications seamlessly connect the GP and PC systems

Through a Web browser (Internet Explorer *) you can monitor the GP in real time and change settings.
You can easily build a seamless, low-cost remote monitoring system with no additional software.

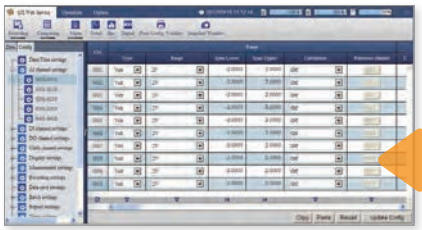
Real time monitoring screen (trend)



Just as on the GP main unit itself, the Web browser lets you divide the display for monitoring on multiple screens, and even create and save your own monitor screens as "Favorites."

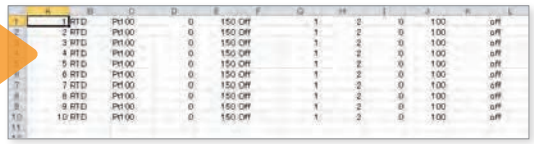
With the scroll bar, you can seamlessly scroll between past and current trends. When the sampling interval is 1 second, the instrument displays 1 hour's worth of historical trends.

Setting screen (AI channel)



The setting screen is highly Excel-friendly, allowing AI channel settings and other information to be copied to Excel for editing and subsequent re-importing into the setting screen.

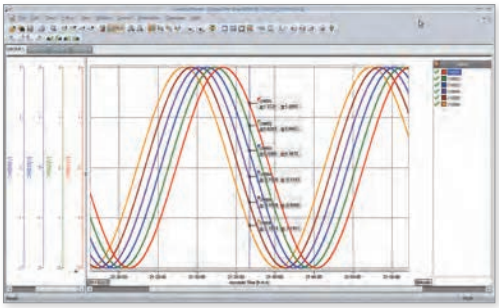
Excel



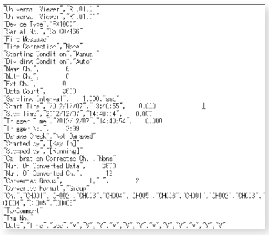
Standard software

Universal viewer

Data files—whether saved on the GP or transferred via FTP or other protocol to a server—can be opened by the viewer for display or printing. For specified data, you can perform statistical computation over an area and export to ASCII, Excel, or other formats.



Data converted to an ASCII file



Offline setting software

Enter various settings on a PC, then save the settings to hard disk or transfer them to the GP. Because you use a Web browser, it's just like using any other Web application.

Supported OS *

· Software available on the Web! ·

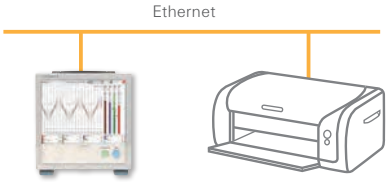
Download the latest version of the software from the following URL: www.smartdacplus.com/software/en/

* For Internet Explorer version and supported OS, see the General Specifications (GS 04L52B01-01EN).

Report and printer output functions

Printer output function

You can print out reports and snapshots directly from the GP without going through a PC.



Report creation function

For each type of report, you can output to a PDF file according to specifiable formats.

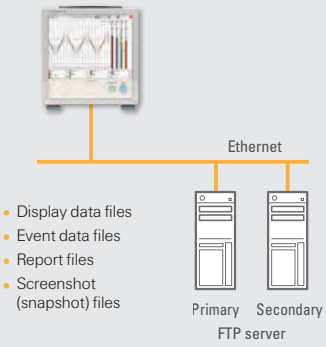
Excel spreadsheet template function

Reports can be created automatically using a spreadsheet template created in Excel.
Excel compatibility means greatly reduced time and effort spent on reporting.

Main networking functions

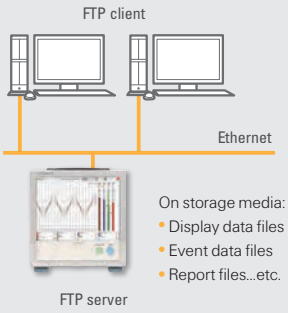
FTP-based file transfer

FTP client function



- Display data files
- Event data files
- Report files
- Screenshot (snapshot) files

FTP server function

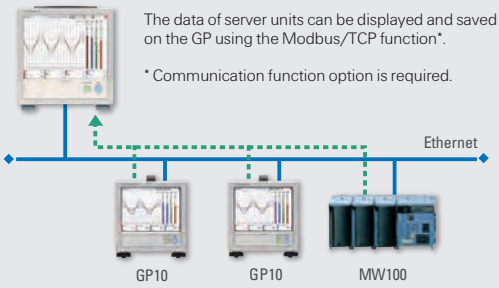


On storage media:
- Display data files
- Event data files
- Report files...etc.

The FTP client/server functions allow you to easily share and manage data from a centralized file server.

Modbus/TCP (Ethernet connection)

Modbus client



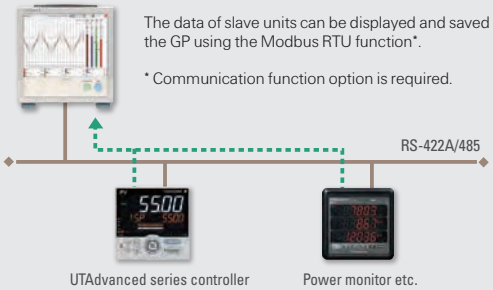
The data of server units can be displayed and saved on the GP using the Modbus/TCP function*.

* Communication function option is required.

(Up to 16 servers can be connected.)

Modbus RTU (RS-422A/485 connection)

Modbus master



The data of slave units can be displayed and saved on the GP using the Modbus RTU function*.

* Communication function option is required.

(Up to 16 slaves can be connected.)

The following network functions are also supported

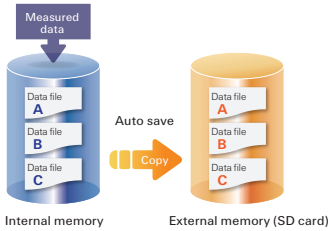
- E-mail sending
- Time synchronization (SNTP)
- Automated network settings (DHCP)

Reliable and durable

Highly secure with proven reliability

Data redundancy

Data redundancy through the internal memory and external storage media.

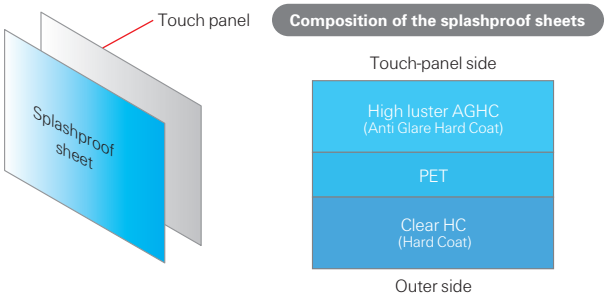


Measured and calculated data is continuously saved to secure, internal non-volatile flash memory. At manual or scheduled intervals, the files in memory are copied to the removable media, which is also secure flash memory. In addition, the files can be copied and archived to an FTP server. Because of the inherent reliability and security of flash memory and the storage methods used, the possibility of losing data under any operating condition or power failure event is extremely small. When FTP transfer functions are used, three copies of the same data file can exist at the same time in three locations, thus providing a high level of redundancy.

Splash-proofing without compromising display quality

The protective sheets on the touch panel display have a special coating on the front and back to prevent damage from scratches, chemicals, and solvents while maintaining a high display clarity and resistance to light interference.

* Visual clarity is enhanced by suppression of the concentric circles that can appear due to light interference.



Selectable data saving format (binary or text)

For increased security, measured data can be saved in binary format. This format is very difficult to decipher or modify in traditional text editors or other programs. To enable easy and direct opening of the data in text editors or spreadsheet programs, choose text format. This allows you to work with your measurement data without dedicated software.

High capacity internal memory

Even longer recording durations, and multichannel recording.

Display data file sample time

Measurement CH = 30 channels. Math CH = 0 channels.

Internal Memory	500 MB
Display update (minute/div)	30 minutes
Sampling period (s)	60 s
Total sample time	Approx. 2.5 years

Event data file sample time

Measurement CH = 30 channels. Math CH = 0 channels.

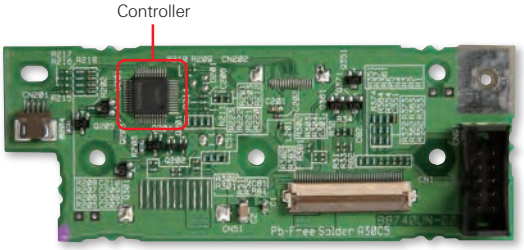
Internal Memory	500 MB
Sampling period (s)	1 s
Total sample time	Approx. 1 months

Standards supported

C US
172608

Two-point touch screen technology

Traditional resistive touch screens can detect only one touch point. The built in controller and algorithm of the GP can detect two touch points, allowing intuitive pan and zoom functions during trend monitoring—a first among paperless recorders.



MAIN SPECIFICATIONS

For detailed specifications, see the General Specifications (GS 04L52B01-01 EN)

Model		GP20	GP10
Construction		Portable	Portable
Display		12.1" TFT color LCD (800 × 600 dots)	5.7" TFT color LCD (640 × 480 dots)
Touch screen		4 wire resistive touch screen, 2-point touch detection	
Max. no. of connectable modules		10 (max. no. of measurement channels: 100)	3 (max. no. of measurement channels: 30)
		* The maximum number of connectable modules is limited by the maximum number of I/O channels, and differs depending on the types and combinations of modules.	
No. of mathematical channels		100	50
No. of communication channels		300	50
Internal memory		500 MB (media: flash memory)	
External storage media		SD memory card (up to 32 GB) (format: FAT32 or FAT16), 1 GB included USB interface (/UH option): USB 2.0 compliant (external storage media: USB flash memory) (Keyboard/mouse: HID Class Ver. 1.1 compliant)	
Communication functions		Ethernet (10BASE-T/100BASE-TX), IEEE802.3 compliant (Ethernet frame type: DIX) Connecting configuration: Cascade max. 4 level (10BASE-T), max. 2 level (100BASE-TX), segment length: Max. 100 m E-mail inform function (E-mail client), FTP client function, FTP server function, Web server function, SNTP client function, SNTP server function, DHCP client function Modbus/TCP (client*/server functions) */MC option is required.	
	Options	Serial communications (/C2: RS-232, /C3: RS-422 or RS-485) Modbus/RTU (master/slave functions)	
Other functions		Security functions: Key lock function, login function Clock functions: With calendar function, accuracy: ±5 ppm (0 to 50°C) LCD saver function	
Rated supply voltage		100 to 240 VAC (allowable power supply voltage range: 90 to 132 VAC, 180 to 240 VAC)	
Rated supply frequency		50/60 Hz	
Power consumption		Max. 85 VA (100 VAC), max. 110 VA (240 VAC)	Max. 45 VA (100 VAC), max. 60 VA (240 VAC)
Insulation resistance		Between the Ethernet, RS-422/485, and each insulation terminal and earth: 20 MΩ or greater (at 500 VDC)	
Withstand voltage		Between the power terminal and earth: 3000 V AC (50/60 Hz) for one minute	
External dimensions (W × H × D)	Main Unit	288 × 318 × 197 (mm)	144 × 168 × 197 (mm)
	Including modules	288 × 318 × 248 (mm)	144 × 168 × 248 (mm)
Weight (main unit only)		Approx. 5.7 kg	Approx. 1.9 kg

Analog input module (Universal input module)

Model	GX90XA			
Input type (Inputs: 10)	DC voltage, standard signal, thermocouple, RTD, DI (voltage contact), DC current (with external shunt resistor connected)			
	DCV	20 mV, 60 mV, 200 mV, 1 V, 2 V, 6 V, 20 V, 50 V	RTD	Pt100, JPt100, Cu10 GE, Cu10 L&N, Cu10 WEED, Cu10 BAILEY, Cu10 (20°C) α=0.00392, Cu10 (20°C) α=0.00393, Cu25 (0°C) α=0.00425, Cu53 (0°C) α=0.00426035, Cu100 (0°C) α=0.00425, J263B, Ni100 (SAMA), Ni100 (DIN), Ni120, Pt25, Pt50, Pt200 WEED, Cu10 GOST, Cu50 GOST, Cu100 GOST, Pt46 GOST, Pt100 GOST
	Standard signal	0.4-2 V, 1-5 V		
	Thermocouple	R, S, B, K, E, J, T, N, W, L, U, W97Re3-W75Re25, KpvsAu7Fe, Platinel 2, PR20-40, NiNiMo, W/WRe26, N (AWG14), XK GOST	DI	Level, Contact
Scan intervals	100/200/500 ms, 1/2/5 s			
Power supply and consumption	Supplied from main unit, power consumption: 0.7 W or less			
Insulation resistance	Between input circuits and internal circuitry: 20 MΩ or greater (at 500 V DC)			
Withstand voltage	Between the input circuits and the internal circuitry: 3000 V AC for one minute; between analog input channels: 1000 V AC for one minute (excluding b terminals)			
Terminal types	M3 screw terminals or clamp terminals			
Weight	Approx. 0.3 kg			

Digital input module

Model		GX90XD
Input types (inputs: 16)		Open collector or non-voltage contact
	ON/OFF detection	Open collector: Voltage of 0.5 V DC or less when ON, current of 0.5 mA or less when OFF Non-voltage contact: Resistance of 200 Ω or less when ON, 50 kΩ when OFF
Contact rating		12 V DC, 20 mA or more
Power supply and consumption		Supplied from main unit, power consumption: 0.7 W or less
Insulation resistance		Between input terminals and internal circuitry: 20 MΩ or greater (at 500 V DC)
Withstand voltage		Between input terminals and internal circuitry: 1500 V AC for one minute
Terminal types		M3 screw terminals or clamp terminals
Weight		Approx. 0.3 kg

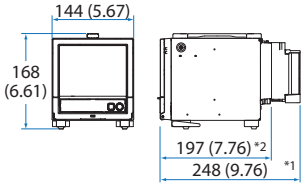
Digital output module

Model	GX90YD
Output types (outputs: 6)	Relay contact (c contact)
Rated load voltage	100 to 240 V AC or 5 to 24 V DC
Max. load voltage/current	264 VAC or 26.4 VDC, 3A/point (resistance load)
Power supply and consumption	Supplied from main unit, power consumption: 1.4 W or less
Insulation resistance	Between output terminals and internal circuitry: 20 MΩ (at 500 VDC)
Withstand voltage	Between output terminals and internal circuitry: 3000 V AC for one minute
Terminal types	M3 screw terminals
Weight	Approx. 0.3 kg

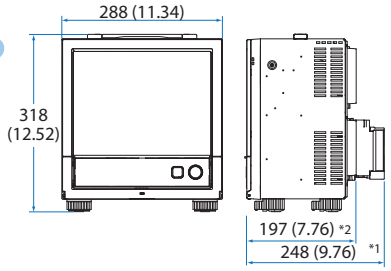
External dimensions

Unit: mm (approx : inch)

GP10



GP20



*1 With module, *2 Without modules

MODEL AND SUFFIX CODES

GP10/GP20 MODEL AND SUFFIX CODES **GP10/GP20: Available in Jan., 2013**

Model	Suffix Code	Optional code	Description
GP10			Paperless recorder (Portable type, Small display)
GP20			Paperless recorder (Portable type, Large display)
Type	-1		Standard
Display language	E		English, degF, DST (summer/winter time)
Power supply	1		100 V AC, 240 V AC
Power cord	D		Power cord UL/CSA standard
	F		Power cord VDE standard
	R		Power cord AS standard
	Q		Power cord BS standard
	H		Power cord GB standard*
	N		Power cord NBR standard
Optional features		/C2	RS-232 *1
		/C3	RS-422/485 *1
		/D5	VGA output *2
		/FL	Fail output, 1 point
		/MT	Mathematical function (with report function)
		/MC	Communication channel function
		/UH	USB interface (Host 2 ports)

Analog input module, Digital I/O module:When the built-in module

Please add the following suffix codes to the main unit model and specification codes.

GP[]0-1-[]1[]/[][]	Optional code	Description
Optional features (Analog input) *3	/UC10	With analog input module, 10 ch (Clamp terminal)
	/UC20	With analog input module, 20 ch (Clamp terminal) *6
	/UC30	With analog input module, 30 ch (Clamp terminal) *7
	/UC40	With analog input module, 40 ch (Clamp terminal) *4
	/UC50	With analog input module, 50 ch (Clamp terminal) *4
	/US10	With analog input module, 10 ch (M3 screw terminal)
	/US20	With analog input module, 20 ch (M3 screw terminal) *6
	/US30	With analog input module, 30 ch (M3 screw terminal) *7
	/US40	With analog input module, 40 ch (M3 screw terminal) *4
	/US50	With analog input module, 50 ch (M3 screw terminal) *4
Optional features (Digital I/O) *3	/CR01	With digital I/O module, (Output:0, Input:16) *7
	/CR10	With digital I/O module, (Output:6, Input:0) *7
	/CR11	With digital I/O module, (Output:6, Input:16) *6 *7
	/CR20	With digital I/O module, (Output:12, Input:0) *5
	/CR21	With digital I/O module, (Output:12, Input:16) *5
	/CR40	With digital I/O module, (Output:24, Input:0) *5
	/CR41	With digital I/O module, (Output:24, Input:16) *5

*1 /C2 and /C3 cannot be specified together.
*2 /D5 can be specified only for the GP20.
*3 Only one option can be specified.
*4 /UC40, /UC50, /US40 and /US50 cannot be specified for the GP10.
*5 /CR20, /CR21, /CR40 and /CR41 cannot be specified for the GP10.
*6 If /UC20 or /US20 is specified, /CR11 cannot be specified for the GP10.
*7 If /UC30 or /US30 is specified, /CR01, /CR10 and /CR11 cannot be specified for the GP10.

* When ordering units with built-in modules, the total number of channels allowed is 100 (10 modules) including any modules ordered individually.

Analog input module, Digital I/O module:When the individual modules

MODEL and SUFFIX Code (GX90XA)

Model	Suffix Code	Description
GX90XA		Analog Input Module
Number of channels	-10	10 channels
Type	-U2	Universal, Scanner type (3-wire RTD b-terminal common)
-	N	Always N
Terminal form	-3	Screw terminal (M3)
	-C	Clamp terminal
Area	N	General

MODEL and SUFFIX Code (GX90XD)

Model	Suffix Code	Description
GX90XD		Digital Input Module
Number of channels	-16	16 channels
Type	-11	Open collector/Non-voltage, contact (shared common), Rated 5 VDC
-	N	Always N
Terminal form	-3	Screw terminal (M3)
	-C	Clamp terminal
Area	N	General

MODEL and SUFFIX Code (GX90YD)

Model	Suffix Code	Description
GX90YD		Digital Output Module
Number of channels	-06	6 channels
Type	-11	Relay, SPDT(NO-C-NC)
-	N	Always N
Terminal form	-3	Screw terminal (M3)
Area	N	General

Standard Accessories

Product	Qty
SD memory card (1GB)	1
Stylus	1

Optional Accessories (Sold Separately)

Product	Part Number/Model
SD memory card (1GB)	773001
Shunt resistor for screw terminal (M3) (10 Ω ± 0.1%)	X010-010-3
Shunt resistor for screw terminal (M3) (100 Ω ± 0.1%)	X010-100-3
Shunt resistor for screw terminal (M3) (250 Ω ± 0.1%)	X010-250-3
Shunt resistor for clamp terminal (10 Ω ± 0.1%)	438922
Shunt resistor for clamp terminal (100 Ω ± 0.1%)	438921
Shunt resistor for clamp terminal (250 Ω ± 0.1%)	438920

·Calibration certificate (sold separately)
When ordering the GP10/GP20 with options (analog input), the calibration certificate for the modules is included in and shipped with the calibration certificate of the main unit. When ordering an analog input module separately, each module gets its own calibration certificate (one certificate per module).

·Test certificate (QIC, sold separately)
When ordering the GP10/GP20 with options (analog/digital I/O), the QIC for each module is included in and shipped with the QIC of the main unit. When ordering analog input modules and digital I/O modules separately, each module gets its own QIC (one QIC per module).

·User's Manual
Product user's manuals can be downloaded or viewed at the following URL.
URL: www.smartdacplus.com/manual/en/

NOTICE
● Before operating the product, read the instruction manual thoroughly for proper and safe operation.

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